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DEFICIENCIES IN THE DENSITY OF SHIP'S REPORTS.(U)
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(6) DEFICIENCIES IN THE DENSITY OF SHIPS' REPORTS

Fleet Numerical Weather Facility
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1. Introduction

One of the prerequisites for improving weather and oceanographic forecasts is to improve the receipt of ships' reports at the world's major analysis centers. The density of these reports determines to a large degree the grid size which can realistically be used in numerical analysis and prediction over ocean areas (Wolff, 1964). In order to correct a certain problem, the problem must be clearly identified. The purpose of this memorandum is to point out certain deficiencies and make recommendations which can be called to the attention of USN, USWB and WMO authorities.

2. Density of Ship Reports

The sea surface temperature analysis program at FNWF records the number of ship reports which lie within 0.707 mesh lengths of each grid point. In this program the grid points are approximately 100 miles apart. Figures 1 and 2 give the typical coverage for December 1964 and January 1965, respectively, which results from a collection spanning 84 hours. These charts therefore show the relative density distribution and not absolute number of ship reports. A chart on ship densities prepared by WMO a few years ago is shown in Figure 3 for comparison. While the first two figures are based on reports received only over those circuits and high-speed data channels held at FNWF, they should represent typical values which can be expected at only the most well equipped analysis centers.

Two different problems are apparent from Figures 1 and 2; the first concerns navigation routes and the second pertains to transmission difficulties. The principal shipping routes vary some from season to season, but in general the density of reports is reasonably sufficient along the major part of the frequented lanes. Additional recruiting of reports is needed from ships of opportunity operating outside of these lanes. It appears as if the best recruiting has been carried out primarily in the Japanese tuna and salmon fishing areas, around Iceland and along the west coast of North America.

The second problem involves the thinning out in the number of reports received from the middle portions of the major shipping routes.

In the Pacific, for example, the lack of a receiving station in the Midway and Aleutian areas is apparently responsible for poorer coverage. Ships in this area cannot contact a shore receiving station to accept their reports (at least not in sufficient time to be synoptic).

In other areas (India and Indonesia e.g.) there appears to be an adequate number of receiving stations. Why does the coverage fall off then? The regional collection centers either aren't taking enough action to get these reports into international networks or don't have the facilities to do so. Similar problems are obvious in the Mediterranean, especially in the Cairo area.

Figures 4 and 5 give the assigned areas of responsibility on which these conclusions are based. Dakar must be doing a good job, but too many ships appear to sink off the Iberian Peninsula. The same can be said for the southern North Atlantic route and the area along the north coast of South America (where no receiving stations are listed).

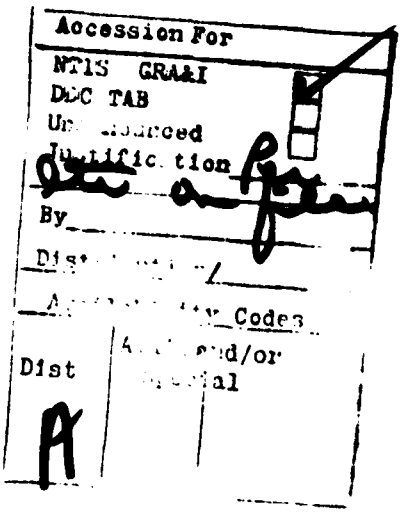
3. Conclusions

The following general conclusions are derived from data coverage studies at FNWF:

a. Additional ships of opportunity should be recruited to report from 'out of the way' areas.

b. The network of designated receiving stations should be revised and augmented where necessary.

c. The subregional collection and forwarding centers should be advised that all ship reports must be fed into the international weather communications network.



References

Wolff, P.M., 1964, Operational analyses and forecasting of ocean temperature structure; FNWF, June 1964

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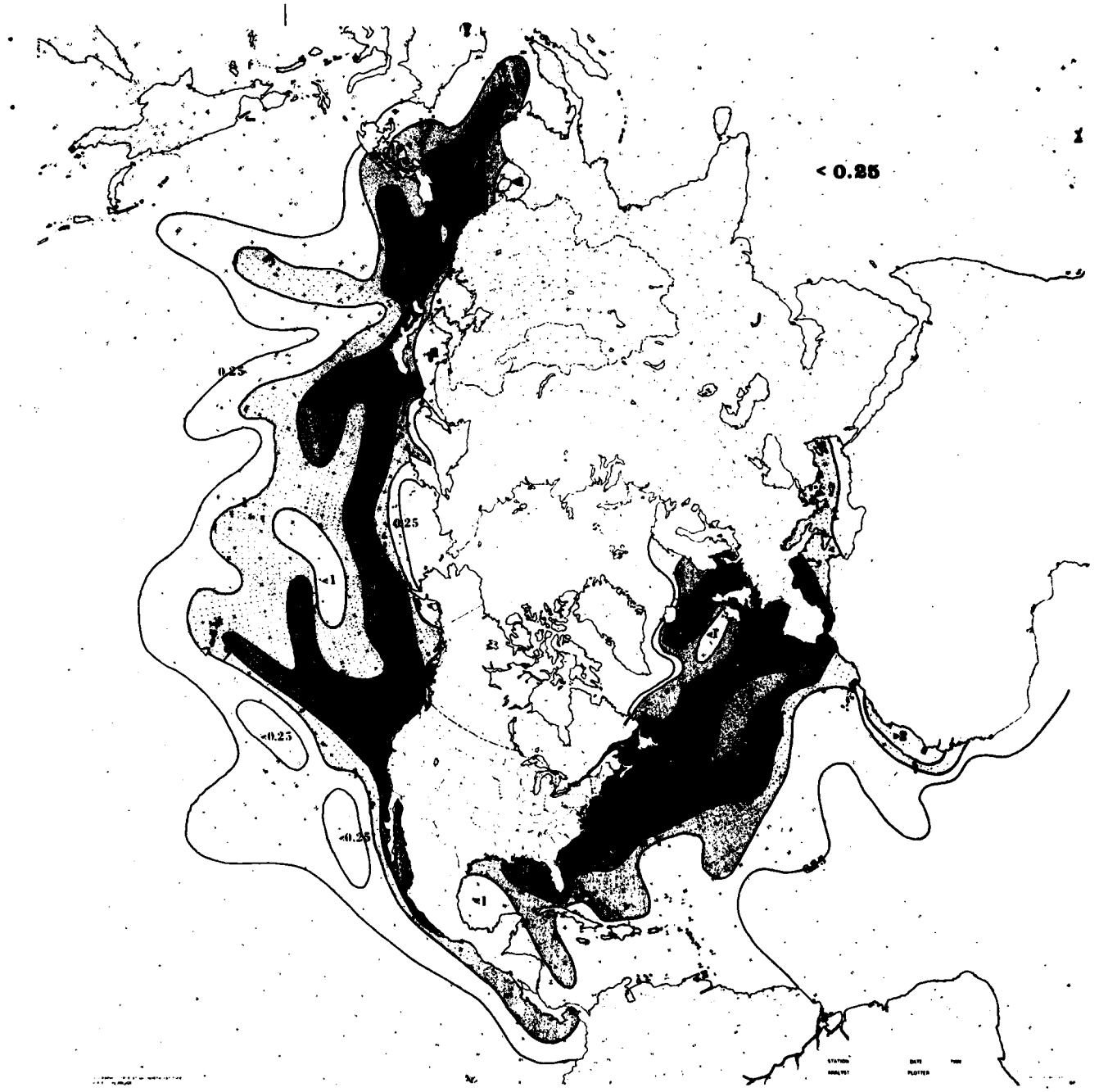

Figure 1. Density of sea surface temperature reports in December 1964.

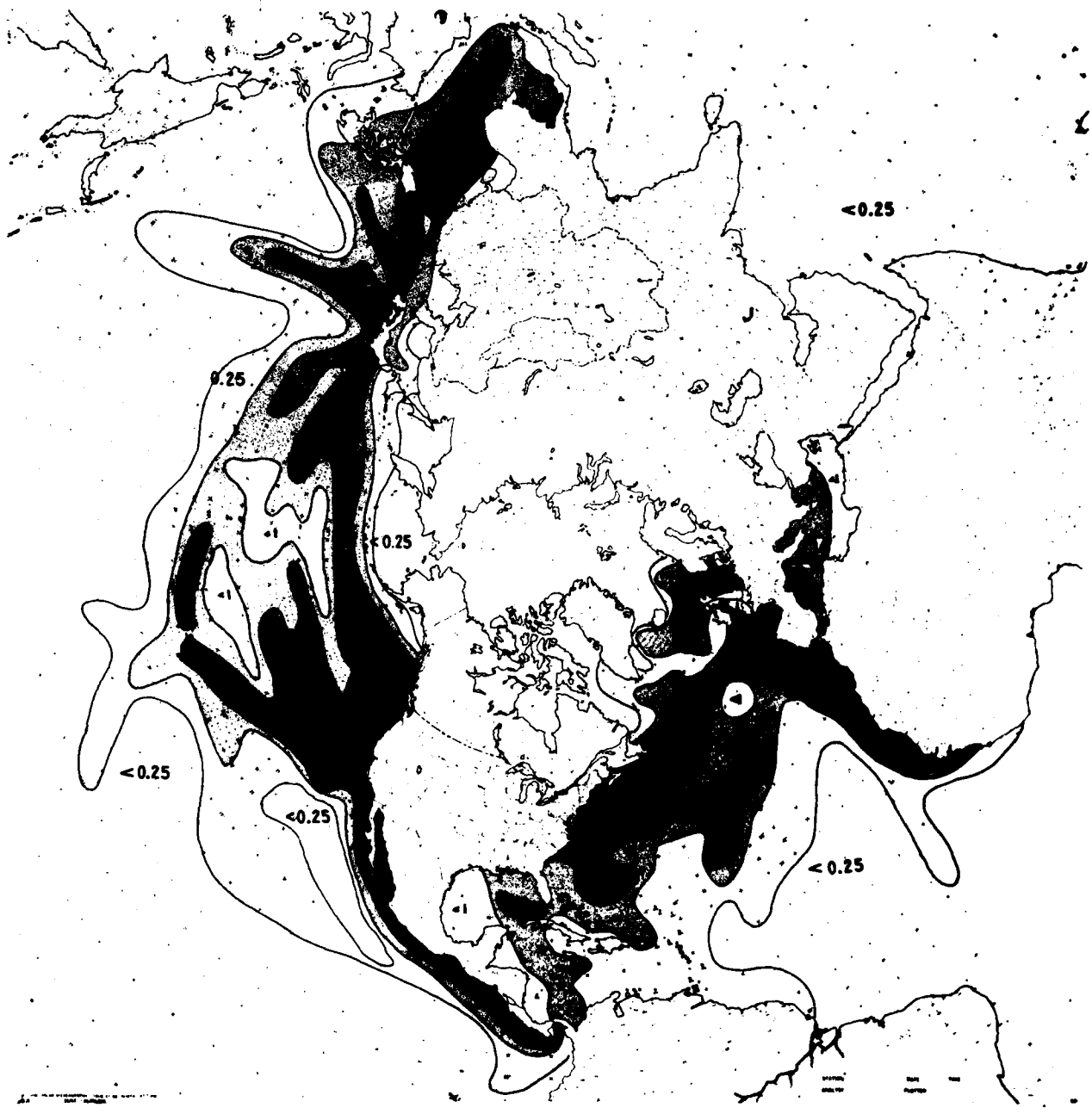

Figure 2. Density of sea surface temperature reports in January 1965.

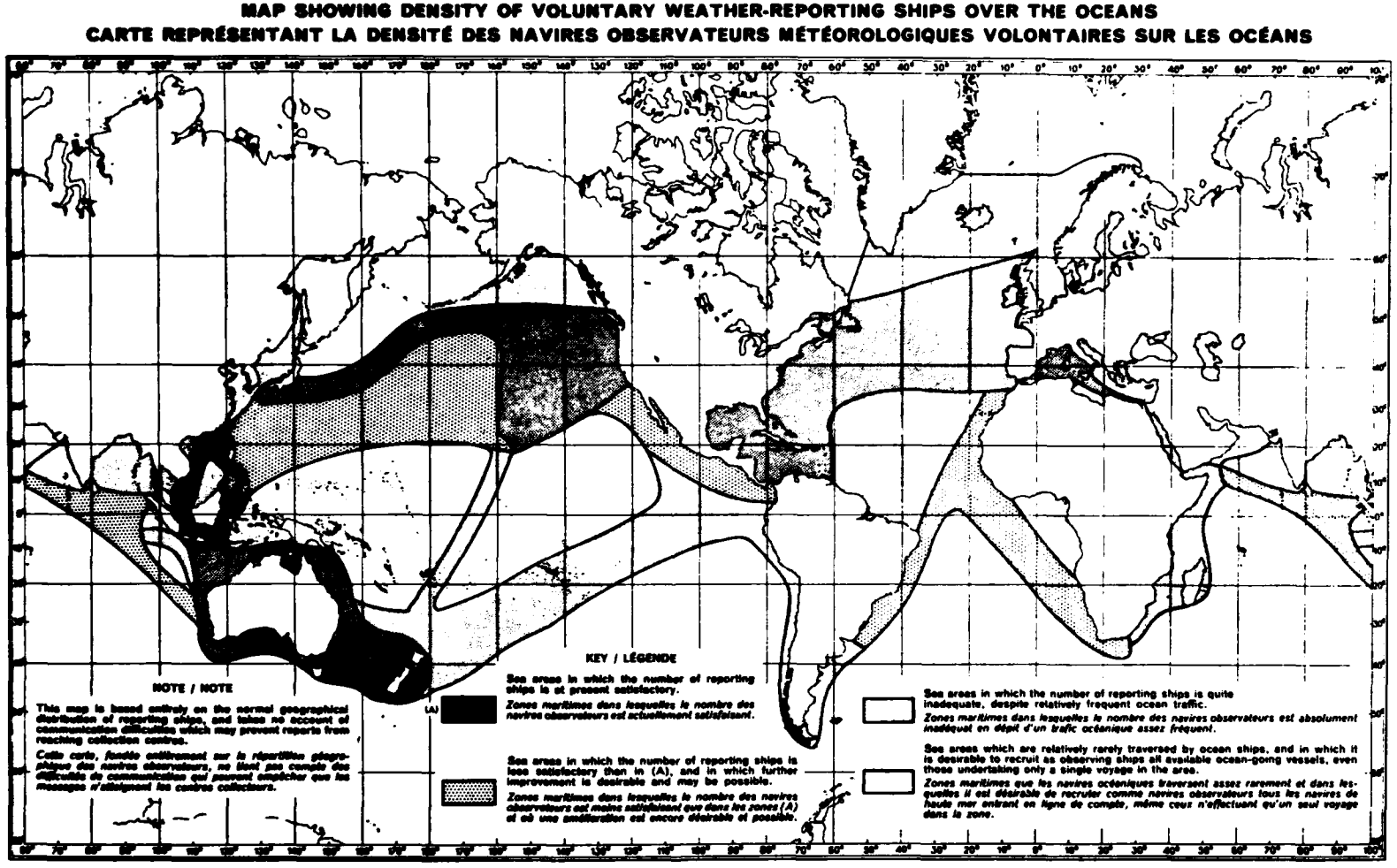

Figure 3. Density of voluntary weather-reporting ships over the oceans. (WMO, Sept 1959)

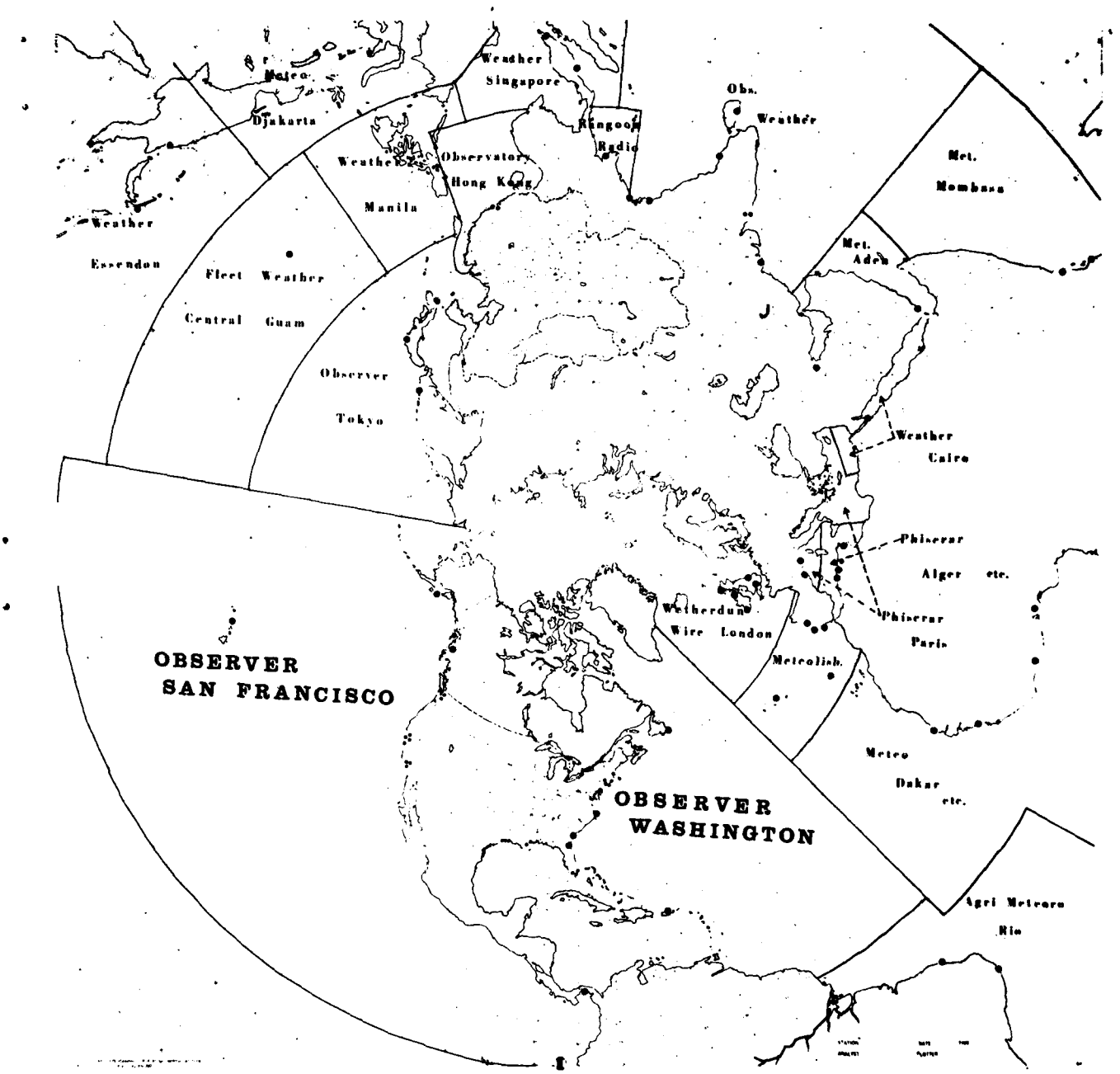

Figure 4. Marine observation receiving stations and collecting areas.

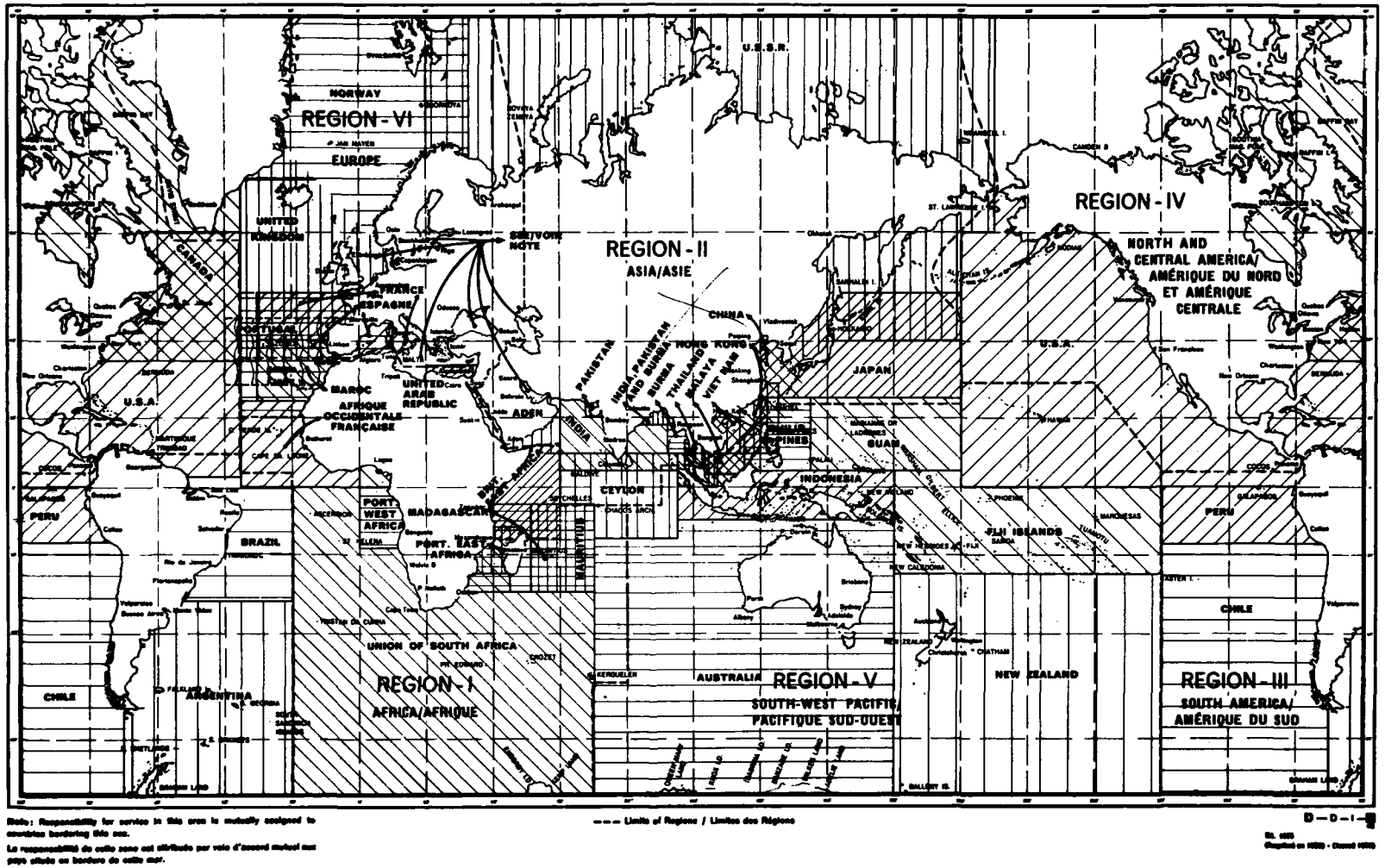

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Figure 5. Responsibility for shipping forecasts. (WMO, 1959).